ALS ENGINES THE COST-EFFECTIVE APPROACH

TO EMS DELIVERY SYSTEMS

FIRE SERVICE FINANCIAL MANAGEMENT

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ABSTRACT

This research project was conducted to analyze Palm Beach County Fire Rescue (PBCFR) Emergency Medical Service (EMS) delivery system to see what enhancements would provide the greatest outcome. The problem was PBCFR had not conducted a cost-effective analysis to determine what enhancements to the EMS delivery system would give the greatest outcome. The purpose of this research project was to identify a cost-effective method to enhance the EMS delivery system within PBCFR, utilizing the current budget and personnel. The research was conducted using historical research methodology to answer; (a) why is there a need to enhance the current EMS delivery system, (b) what are the options to enhancing the current EMS delivery system and the cost effectiveness of each option, (c) does PBCFR have sufficient resources to implement the identified options, (d) is there alternative funding available to off set the cost of the identified options.

Historical research was conducted by utilizing the statistical data from PBCFR annual reports from FY1995 to FY2000, trade journals and the Internet to gather information on alternative EMS delivery systems.

The research identified possible enhancements PBCFR can implement to bring their EMS delivery system up to today's levels and projected expansion. The information will provide PBCFR with a cost-effective analysis to address the increasing demand on the EMS delivery system.

There are several recommendations that are to be made from this research. They involve areas such as; current staffing, EMS delivery system enhancements, and future needs. Additional research will be required in regards to the impact the department will experience with the changes in the ambulance fee schedule and the staffing level standard presented in NFPA 1710.

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INTRODUCTION

Palm Beach County Fire Rescue (PBCFR) has shown an increasing demand on the current Emergency Medical Service (EMS) delivery system provided to the citizens of Palm Beach County. The increased demand has forced PBCFR to identify methods to enhance the Advanced Life Support (ALS) portion of the EMS delivery system.

The problem is PBCFR has not conducted a cost-effective analysis to determine what enhancements to the EMS delivery system will give the greatest outcome. The enhancements must be accomplished while working within the current budgetary constraints and paramedic shortfall. The department has approached its three-mill rate cap and must contain any additional cost within the current budget.

The purpose of this research project is to identify a cost-effective method to enhance the EMS delivery system within PBCFR, utilizing the current budget of $140 million and 1000 personnel. The department's number one goal over the years has been to improve our response times. The increasing system demand and need for paramedics has had an impact on the department's efficiency and effectiveness to maintain the highest level of care.

This research project involved historical research methods in several areas such as; the EMS delivery system over the past three years, review of statistical data from PBCFR annual reports, industry journals and the Internet.

The following questions were answered utilizing historical research methodology:

1. Why is there a need to enhance the current EMS delivery system?

2. What are the options to enhancing the current EMS delivery system and the cost effectiveness of each option?
3. Does PBCFR have sufficient resources to implement the identified options?
4. Is there alternative funding available to off set the cost of the identified options?

BACKGROUND AND SIGNIFICANCE

Palm Beach County Fire Rescue has been in existence since 1984 to provide fire and emergency medical services to portions of unincorporated and select municipalities within Palm Beach County. PBCFR has always been the primary Basic Life Support (BLS) and ALS treatment provider. In March 1995, PBCFR became the transport provider for all ALS patients and a private company became the transport provider for all BLS patients.

PBCFR is a major metropolitan fire rescue department that services a county with a population of over one million people and an area of over 550 square miles. The coverage is provided by 35 stations which are equipped with; two quints, eight ALS engines (five that are staffed in an" either or" configuration), 19 BLS engines, and 37 ALS rescues (two stations that house two ALS rescue units in an" alpha bravo" configuration). In addition, three stations are equipped with ALS rescue pumpers (transport rescue units with 250 gallons of water, 15 gallons of foam and 250gpm pump) to provide both fire and EMS to a given area. (Appendix A)

The staffing of PBCFR units varies depending on the function of the unit. All quint’s and BLS engines are staffed with three personnel, a driver engineer, company officer and one firefighter emergency medical technician-basic (EMT-B). The ALS engines are staffed with three personnel, a driver engineer, company officer and one

firefighter paramedic (EMT-P). All "either or" stations and ALS rescue pumpers are staffed in the ALS engine configuration with three personnel, a driver engineer, company officer and one firefighter paramedic. In 1999, the department began to staff three ALS rescues with three personnel, two paramedics and one EMT-B. All other ALS rescues are staffed with two personnel, one firefighter paramedic and one firefighter EMT-B as the minimum.

In the past 15 years, there have been a number of environmental changes (National Fire Academy [NFA], 1992) within the department. The Labor/Management relationship has changed to better the department and its personnel in many areas. One area that has been addressed through labor relations is the increasing need for paramedics within PBCFR.

Since 1986, PBCFR has hired applicants with a minimum EMT-B state certification and firefighter state certification. The present labor contract requires all employees hired after January 1,1986, to remain a minimum of an EMT-B. This holds true for those hired as paramedics; they must remain a minimum of a paramedic. In addition, those hired “after October 1,1999, may be required to become a department protocoled paramedic within 36 months of hire, and shall function as such as a condition of continued employment”. (Professional Firefighters and Paramedics of Palm Beach County [Local 2928], 1999)

In 1998, during labor relations it was agreed that the department would fill 60 vacancies the department had with paramedics only. In late 1998, the department conducted a special hire of 14 paramedics. In 1999, the special hire of paramedics continued with 57 additional paramedics being hired for a total of 71. In the past 14 months, the department has hired a total of 77 personnel and of those 77 personnel 45

are required to become a paramedic within 36 months. Over the past three years the department has hired a total of 103 paramedics. (Appendix B)

The department presently has a workforce of over 1000 personnel with 454 certified paramedics; each shift has an average of 131 paramedics. In order for the department to staff all the ALS units, it must maintain a minimum of 45 paramedics each day. The desired level of service is to have two paramedics on each ALS unit. In order to fulfill the desired level the department would need to increase its minimum level of paramedics to 80 each day.

The above proposal to increase the paramedic staffing level to a minimum of 80 per day is on going in contract negotiations. It is also proposed that there be the development of ALS engines and three person ALS rescue units to increase the level of care to the public. All of the above proposals would require the department to hire additional paramedics to staff the units.

In FY 1995 PBCFR handled 57,244 total calls and 41,736 were medical related calls (Appendix C), resulting in approximately 73% of the total calls being medical related. (PBCFR, 1995)

In FY 2000 PBCFR handled 76,101 total calls and 55,127 were medical related calls (Appendix C), resulting in approximately 73% of the total calls being medical related. The medical call volume has increased over the past five years by approximately 32%. (PBCFR, 2000)

This research is being conducted to fulfill the applied research project requirements for the *Fire Service Financial Management* (FSFM) class at the National Fire Academy's Executive Fire Officer Program (EFOP). The concepts learned in the class were applied to the stated problem of this research project. The areas to be used

are Forecasting, Analysis, Alternative Funding, and Internet Resources. The information discovered during this research would be used to identify a cost-effective method to enhancing the EMS delivery system within PBCFR. (NFA, 1997)

LITERATURE REVIEW

Statistic Review

The first area of literature review was to evaluate the effectiveness of our department's EMS delivery system. It was found that there was an increasing demand on the current EMS delivery system as shown in the rising call volume and ALS transports.

The department's statistical data (1995-2000) was used to compile common factors in relationship to daily staffing levels (Appendix A), hiring practices (Appendix B), and call volume (Appendix C). The information gained would be used to develop a cost-effective analysis and identify what enhancements to the EMS delivery system would give the greatest outcome. Utilizing the lessons learned from the National Fire Academy's *Organizational Theory in Practice* class (NFA, 1992), statistical forecasting presents evidence of an increasing demand on the current EMS delivery system and requires change to keep up with the demand.

Another area explored was the revenue generated by the transporting of ALS patients. The data was collected to identify if the increase in transports over the past three years created an increase in revenue at the same rate. The information was being maintained in two different areas within the department. Two reports were obtained to study the totals for three years (FY1998-FY2000). One report gave the number of

transports by station, and the other gave the total revenue billed and collected. The information had to be placed into a chart to explore the past, present, and future trends (Appendix D). This data was also used to explore the collection rate of PBCFR and the amounts being charged for ALS transports. (PBCFR, 1998-2000)

It was discovered that PBCFR has an ALS transport fee collection rate of 80%, which is one of the highest in the state of Florida. PBCFR in FY1999 billed $6,930,549 and collected $5,589,341 at a collection rate of 80%. In FY2000 PBCFR billed $7,644,635 and collected $5,870,337 at a collection rate of 78%. It needs to be noted that claims continue to be paid and are credited to the year billed. FY2000 is one that the department is still receiving revenue from. (PBCFR, 1998-2000)

Industry Journals

As with other applied research projects (ARP) conducted, I started the research for information with one of the leading EMS journals JEMS. JEMS offers a great deal of information on EMS issues and for this ARP the information reviewed dealt with average transports, EMS delivery systems, and the future of EMS.

I started with an article in the February 2000 issue of JEMS titled *"EMS trends in America's most populous cities"*. The article was a survey of 200 most populous cities in America. The departments were asked a number of questions dealing with their EMS delivery system. In the article, JEMS reports that, "among all responding agencies, the average combined fleet is 20 vehicles", or "one vehicle per 18,111 people". They also reported that, "an average of 38.6% of patients required ALS treatment, according to the 143 agencies answering this question". (Lindstrom & Mayfield, 2000)

The transport averages were also contained within the article, and according to JEMS, the average transport ratio was 67.1%, out of the 150 agencies answering the question. “This means that nationally each ambulance averages 2,256 responses per year and makes 1,414 scene-to-hospital transports. On a per capita basis, this translates to 1,246 responses and 781 transports last year for 10,000 people”. (Lindstrom & Mayfield, 2000)

The survey also requested billing and collection ratios from departments being surveyed and fewer than 50% responded. Of the departments that did respond to the question, “the reported collection ratios range from 12-90%”. JEMS also reports that, “the average collection ratio among reporting agencies is 57.6%, with 60% most frequently reported”. (Lindstrom & Mayfield, 2000)

Each year JEMS conducts the “*200-City Survey*” on EMS organizations and operations of the most populous cities in America. As with the February 2000 issue, I reviewed the February 2001 issue, *“Operational & clinical EMS trends in large, urban areas”*, to see if there might be information valuable to my ARP. (Cady & Lindberg, 2001)

The 2000 survey was filled with a good amount of information on EMS operations and delivery systems of the 200 cities surveyed. One area that dealt directly with my ARP is that departments are moving in a direction of assessment units or some type of first responder to conserve transport units. JEMS reports, “it’s interesting to note that 5% of respondents reported they initially send first responders to determine certain patient conditions and then dispatch an ambulance if deemed necessary. Capable of conserving transportation resources, this strategy will likely

become more popular in light of impending changes to ambulance transportation reimbursements schedules". Departments like San Jose, California are sending ALS Engines to calls of minor medical nature, due to the likelihood the patient will not need to be transported. (Cady & Lindberg, 2001)

With the need to expand EMS operations, 71% of the fire service agencies responding to the survey report they are increasing their ALS capabilities on the first responder apparatus. The article adds, "ALS staffing in those systems varies from only a few engines with ALS staffing to systems that currently have all engines staffed in the ALS level". There is no mention of staffing levels on these apparatus. (Cady & Lindberg, 2001)

In the area of system performance strategies JEMS reports that, "Rationalizing response time performance requirements is a key strategy to keep system resources available for life-threatening emergencies and to manage costs." They also report that, " Changes in the performance requirements will enable system managers to develop more efficient deployment strategies". (Cady & Lindberg, 2001)

The key element to this article lies within the summary when the author stated, "the capture and analysis of operational and clinical data by EMS systems will prove essential to understanding what changes can be made to enable them to meet future demands". This will be one of the fundamentals used to address PBCFR problem. (Cady & Lindberg, 2001)

The next area that needed to be explored was EMS delivery systems and the recommendations from the leading departments in reference to staffing ALS units. One article was found in Emergency Medical Services (EMS) magazine, it dealt with

staffing issues of several leading departments. It describes alternative EMS delivery systems being used across the country.

The article *Ambulance Staffing: When 1+1 = Confusion* in the July 2000 issue of EMS magazine, which describes proposed changes of the city of Los Angeles Fire Department (LAFD) EMS delivery system. LAFD's proposal of "one-plus-one" would remove one of the paramedics from the ALS ambulance and places them on an assessment engine. This would increase the EMS delivery system in LAFD response area by adding additional ALS units with existing personnel. There was a great deal of opposition to the plan by the workforce and paramedic associations. One of those that opposed the plan was LAFD paramedic Captain Robert Linnell, who is also the president of the LAFD paramedic association. Captain Linnell states, " there are two systems being used nationwide: One and One, which is one paramedic and one EMT, and that's all you get; or one plus one, which is the system being proposed for Los Angeles". Captain Linnell also added that, "one-plus-one" works like so, " the ALS calls are triaged at the dispatch center, based on medical dispatch protocols, and two resources, each with one paramedic, are dispatched and will arrive at various times." Then he explains, "if it's a slow area and all of the resources are available, they often arrive together". (Nordberg, 2000)

San Diego went to the "one-plus-one" delivery system three years prior to LAFD proposed change and it has been reported in the article that it seems to be working very well for them. Captain Linnell states, " Originally, San Diego had paramedic/firefighters on about half of their fire engines; their system now puts a paramedic on all 43 engine companies, so every area of San Diego has at least one

paramedic, and that's better than what they had. The system seems to work for them". (Nordberg, 2000)

EMS magazine reports that LAFD as of 1998 had "a total of 460 paramedics served a population of 3.8 million, with a ratio of one paramedic per 8,000 citizens—by far the highest in the country". Still, LAFD claims they have a shortage of paramedics. (Nordberg, 2000)

Another opposing view to the LAFD EMS delivery change is from Captain Kevin R. Nida, president of the Los Angeles City firefighters association. Captain Nida response to the change by stating, "it's diluting the system". He also adds, "we do criticize the large populated areas who have a high call load when they use one plus one to dilute the system and make the taxpayers believe they're getting better service". (Nordberg, 2000)

The article brings out the point that there are no measurement tools available to determine if two paramedics are better than one paramedic. Captain Linell adds, "in terms of evidence-based medicine, we know of no retrospective or prospective studies to show that one paramedic can perform as effectively and efficiently under the same stress levels as two regularly partnered paramedics". There is also the other side of the coin, that there are no studies to show that two paramedics are better than one paramedic. (Nordberg, 2000)

As the opposition pointed out the impact on the system, the supporting side brings out the benefits of the proposed changes. LAFD medical director Dr. Marc Eckstein sides with the proposed changes, as he states, "We're going to get a paramedic on scene for almost every EMS incident, not only faster but as a first

responder". Dr. Eckstein also brings the patients prospective to the forefront by adding, "from a patient care prospective, it's tough to argue that. There are pros and cons, risks vs. benefits to any change you make in pre-hospital medicine, and, to me, the pros clearly outweigh the cons here". (Nordberg, 2000)

The doctor also addresses paramedic burnout and that the change to the EMS delivery system will allow paramedics an option to ride on ALS transport units or ALS engines. This removes the feeling of being limited to an ALS transport unit for their entire career and gives the paramedic the ability to move back and forth from one unit to the other. The proposed changes allow the paramedic to maintain their fire fighting skill that so many have lost. (EMS, 2000)

Alan Cowen, a paramedic for 28 years also supports the change by adding, "the fire department has never had a good grasp of EMS since it took over in 1970, and they've starved it in the budget". (Nordberg, 2000)

The article also identifies several other departments across the country that is utilizing a "one-plus-one" configuration, and it seems to be working for them. There were two departments identified in the article, St. Louis Fire Department and Brevard County Fire Rescue, in Brevard County Florida. St. Louis Fire Department was faced with a shortage of paramedics and found the "one-plus-one" configuration was an answer to the shortage. They were able to continue to staff their 36 engine companies with paramedics by implementing the change. In the case of Brevard County, they were faced with fast population growth and budgetary constraints. This similar to PBCFR situation with excessive growth and ceiling limits placed on the funding of fire and rescue services. (Nordberg, 2000)

In Minnesota, the state guidelines allow the EMS providers to staff their ALS units with one paramedic and one EMT. Although, the county of Hennepin, in which Minneapolis lies, has staffed their units with two paramedics due to a local ordinance requiring them to do so. In 1999, they almost lost the ordinance due to federal funding cuts. The proposal would have replaced the two paramedics with one paramedic and one EMT. The labor groups were successful in maintaining the ordinance. Dr. Patrick Lilja, medical director of Emergency & Trauma Services at North Memorial Medical Center in Robbinsdale, MN adds that the defeat of the proposed ordinance change "was strictly political and had nothing to do with patient care or anything else". Dr. Lilja adds that, "for one thing, there is no literature out there -none- that says two paramedics provide better care or have better cardiac arrest outcomes than a paramedic and an EMT". And he states, "I think it's a labor issue more than a medical quality issue". (Nordberg, 2000)

As the article comes to a close Dr. Eckstein states, "People might say, if you had unlimited funds and in an ideal world, would you have a medic on every engine and two on every ambulance? Of Course". As a final thought Dr. Eckstein adds, "when push comes to shove and the bell rings, I think the medics will do the right thing, and I'm convinced we'll save more lives because of it". (Nordberg, 2000)

The January 2000 issue of EMS magazine had a section titled *Millennium EMS*. The section brought together the movers and shakers of the EMS industry and listed their predictions on the delivery of EMS in the 21st century. (EMS, 2000)

Mike Smith of the Emergency Medical Training Associates wrote one of the articles titled *The Last Paramedic*. In the article he states that, "The academic

institutions marketing the new, improved paramedic, i.e., the critical-care paramedic (CCP). This is what paramedic was always intended to be—a critical-care specialist". He also states that, "big bucks can be charged for what should be covered in two or three in-services". The ability for a department to charge more gives them the ability to cover the increasing cost of providing the service. Mike Smith also mentioned the use of EMT-intermediates by his last statement, "What remains will be some CCP's and a busload of intermediates". (Smith, 2000)

In the same section Gordon Sachs wrote an article called, *The Expansion of EMS*. In the article he reported that, "In all, 21st century EMS will be an expanding field". He also adds that, "Occupationally, it will become the public safety field of choice and will be considered a healthcare profession by the medical community". The article brings out the increasing need to expand into the field of home health care and develop the fire stations into neighborhood health and safety centers. This will contribute to the increase need for paramedics to staff the stations during the time the assigned units are out on calls. (Sachs, 2000)

According to EMS Magazine *State and Province Survey*, which is published annually. Florida statistics for total number of licensed ambulance vehicles, which includes Rescue vehicles, have doubled over the past 19 years. The total number of ambulances in 1980 was 721 and rose to 1824 in 1999. It also reported that the number of certified EMS providers has increased over the past two decades from 15,000 EMT-basic and 2,000 paramedics in 1980, compared to 18,895 EMT-basic and 10,333 paramedics in 1999. (EMS, 2000)

According to the *Occupational Outlook Handbook,* the forecast growth of a firefighter with no medical training will be approximately 4.7% and will have a slow growth through 2006. On the other hand, a firefighter with EMT-basic, EMT-intermediate, or EMT-paramedic will increase at a much faster rate, close to 31% overall. The employment of EMT's is expected to grow much faster than average for all occupations through the year 2006. The handbook also states that, "driving the growth will be an expanding population, particularly in older age groups that are the greatest users of emergency medical services". They make mention that the occupation of EMT-paramedic has a substantial replacement needs. They contribute the replacement needs to turnovers caused by "stressful working conditions, limited advancement potential, and modest pay". The increasing demands on field paramedics have had an impact on the retention of those assigned to ALS rescue units. The responsibilities increase daily with very little movement compensation wise. (Bureau of Labor Statistics [BLS], 1999)

Internet Resources

The Internet provided a number of department profiles on EMS delivery systems utilizing ALS engines. Several of the departments reporting increased utilization of ALS engines were found to be located in Florida. There were two Florida department profiles found to be informative, Hillsborough County Fire Rescue and Seminole Fire Rescue. Both of these departments shared the same goal to provide an improved paramedic response time and level of service to the citizens they protect. In Hillsborough County Fire Rescue (HCFR) the ALS rescue units are staffed normally with two paramedics one being an officer, and the ALS engines are staffed

with one paramedic. HCFR is presently staffing 18 ALS rescue units and 14 ALS engines with a total of 180 paramedics. HCFR reports that, " the ultimate goal is to have a cross-trained, dual-role firefighter/paramedic on all career fire apparatus". Due to the size of Hillsborough County (931 square miles) they have found that, "this would be the most efficient way to provide outstanding services". They also state, "We feel certain that the enhanced service level to the citizens of Hillsborough County will be an improvement". (HCFR, 2001)

Another site explored was EmergencyNet NEWS (ENN) Emergency Services Reports, which provided a news release on the City of Chicago Fire Department. The report titled *Chicago to implement paramedic-engine companies,* describes how the Chicago fire department was implementing paramedic engines that would save the city millions of dollars. The report states, "Fully equipped and staffed Paramedic-Engines are more cost-effective way to increase emergency medical service than just adding more ambulances. Instead of spending $6.5 million to purchase and staff ten more ambulance Mayor Richard Daley is taking credit for a plan that will add the equivalent of 24 ambulances for less than one-tenth of the cost". The report adds that the cost of implementing 24 paramedic engines would be under $600,000 and existing personnel would be used to staff the units. (ENN, 1997)

In summary, it has been discovered that the increasing demand is being felt across the nation. There is sufficient material to show that the need for change in the EMS delivery system is warranted. The key is what will be the most cost-effective approach to the problem, without endangering the greatest outcome. The increased system demand is going to become a greater problem in the next five to ten years if it

is not dealt with now. The utilization of ALS engines in a first responder approach combined with a system similar to the "one-plus-one" may give the greatest outcome to the citizens of Palm Beach County.

PROCEDURES

Definition of Terms

EMT-basic (EMT-B)- provides pre-hospital care, may open airways, restore breathing, control bleeding, treat for shock, administer oxygen, immobilize fractures, bandage wounds, assist in childbirth, manage emotionally disturbed patients, treat and assist heart attack victims, give initial care to poison and burn victims, and use automated external defibrillators to assist in the care of patients experiencing cardiac arrest. (BLS, 1999)

Paramedic (EMT-P)- provides the most extensive pre-hospital care. In addition to the procedures already described, paramedics may administer drugs orally and intravenously, interpret electrocardiogram (EKG's), perform endotracheal intubations, and use of monitors and other complex equipment. (BLS, 1999)

ALS Rescue Pumper- provides both fire and EMS services to a given area utilizing a transport rescue unit equipped with 250 gallons of water, 15 gallons of foam and 250gpm pump. (PBCFR, 1999)

Research Methodology

This research project involved historical research methodology. Historical research was conducted by utilizing the statistical data from PBCFR annual reports from FY1995 to FY2000. The data was analyzed to identify trends or common factors in daily staffing levels (Appendix A), hiring practices (Appendix B), and call volume (Appendix C). The data was used to forecast the future increases in call volume by using the linear regression model provided by the FSFM class (Appendix D). (NFA, 1997)

The next area of research was conducted by the utilization of trade journals. There were two journals JEMS and EMS magazine that provided a great deal of information on the current status and future of EMS delivery systems. The utilization of ALS engines was also covered very well by the trade journals.

A search was conducted over the Internet to gather information on the utilization of ALS engines and paramedic performance measurement tools. A limited amount of data was obtained in the area of performance measurement tools for paramedics. It appears that there is progress being made to develop paramedic performance measurement tools to show the differences in staffing units with one paramedic or two paramedics.

Limitations

It was assumed that there would be a great deal of information on paramedic performance measurement tools. The lack of information on this subject became a limitation to this project. Staffing configurations on ALS units also became a limitation to this project in the area of cost-effective analysis. All of the information

found stated that ALS engines were cost effective, but there were no identified measurements.

Another area that became a limitation to this ARP was the access to the annual reports generated by PBCFR. It was found that reports up to FY1997 were available for all personnel to view and obtain copies without any problems. Annual reports after FY1997 had to be requested and the information provided was limited or kept in several areas within the department.

RESULTS

The research identified possible enhancements PBCFR can implement to bring their EMS delivery system up to today's levels and projected expansion. The information will provide PBCFR with a cost-effective analysis to address the increasing demand on the EMS delivery system.

Answers to Research Questions

Research Question #1.

1. Why is there a need to enhance the current EMS delivery system?

As with many departments across the country, what PBCFR faces is not a new concept. As found in the research, a great deal of departments are facing the same increase in demand with reduced available resources. Department's are being required to re-deploy their resources to accommodate the increasing demand. The data obtained from PBCFR annual reports indicates a steady increase of approximately 5% in both call volume and ALS transports (Appendix C). The data is showing a correlation of increased medical calls and ALS transports (Appendix E), this holds true

for increased call volume and medical calls. PBCFR has shown a 33% increase in call volume over the past five years and a 32% increase in medical calls (Appendix C). One factor that explains the increase in all areas is the fact that Palm Beach County is one of the fastest growing counties in the southeastern United States. The indicators for PBCFR to enhance their EMS delivery system are: increasing population, increasing growth, increasing call volume, increasing workload on personnel, and increasing ALS transports. All of the indicators are compounded by the shortfall of paramedics the department has currently experienced. There is also the limitation or budgetary constraint that PBCFR is presently experiencing by maintaining the mill rate cap of three-mills. The data indicates to overcome the increasing demand a cost-effective change to the EMS delivery system within PBCFR is required.

Research Question #2.

2. What are the options to enhancing the current EMS delivery system and the cost effectiveness of each option?

Option One: The department is presently conducting Labor/Management meetings to implement a change in our EMS delivery system. The proposal that is being presented will require the department to increase its minimum daily staffing levels from one paramedic on an ALS unit to two paramedic on all ALS units. The end result would be to increase the minimum daily staffing number of paramedics from 45 to 80 for each shift. The addition would require the department to hire additional paramedics or pay overtime to maintain the minimum daily staffing levels. This proposal does not add any additional units to our fleet or increase the EMS capabilities of any of our BLS units. Due to the nature of the proposal it will be consider option one (Appendix F) in this ARP.

Option one will require the department to increase its minimum daily staffing level of paramedics to 80 paramedics, which will result in an increase of 35 paramedics per shift per day. There is presently an average of 107 assigned paramedics per shift. When you remove the maximum paramedics allowed off on any given shift, due to kelly days and vacation, you must reduce the count by 34 paramedics leaving a balance of 73 assigned paramedics on duty each shift. There would be a shortfall of seven paramedics per day. The shortage would have to be covered with overtime at approximately $650.00 per paramedic per shift resulting in an approximate annual cost of $1.65 million. (note: the cost can vary due to using the average paramedics hourly rate of $18.00) The other option is to fill the paramedic shortfall by hiring 21 paramedics at an approximate cost of $ 1.5 million. The increase in paramedics would be an ongoing expense.

The increase in cost with no additional outcome to the citizens of Palm Beach County eliminates this proposal from any further consideration.

Option Two: Option two (Appendix F) involves the increase of nine ALS engines and four ALS rescues with three personnel. With this option the increase would provide a limited amount of enhancement to the present EMS delivery system presently found within PBCFR. The addition of ALS engines will give the high demand areas an additional ALS unit to reduce the ALS response times. The citizens of the enhanced and surrounding response areas would see a positive outcome. The enhancement would require the purchase of additional ALS equipment at an approximate cost of $37,000 per unit, and the increase in assignment for the officer and driver of the unit. The assignment pay will vary based on the qualifications of the crew, EMT assignment pay would be 5% and paramedic assignment pay would be

10%. The ALS equipment and the assignment pay would be approximately $60,000 for each unit.

The minimum daily staffing level of paramedics would increase from 45 to 62 for each shift. The additional paramedics required would come from the existing 73 paramedics on duty each day and would not require overtime or hiring of paramedics. The department's overall minimum daily staffing levels would increase by four personnel, the increase would not require any additional personnel as they already exist in the system. To place a third person on the ALS rescues as an EMT-B it will cost 5% for each assignment. This option has 12 positions that would be entitled to the 5% EMT-B assignment pay. The cost of the EMT-B assignment pay would be approximate $2300 per position or a total cost of $27,600 annually for the 12 positions.

The overall enhancements of the EMS delivery system with this option are as follows; implementation of nine ALS engines at a cost of $540,000 ($60,000 per unit), implementation of four ALS three person rescues at a cost of $27,600, and implementation of one two paramedic unit with no additional cost. The total startup cost for this proposal is approximately $567,600 ($333,000 equipment cost and $234,600 ongoing incentive costs). (Appendix F)

This option presents a positive outcome to the department and the citizens of Palm Beach County by providing a cost-effective EMS delivery service.

Option Three: This option includes all of the enhancements listed in option two (Appendix F) plus the addition of three ALS engines, two ALS rescue with a third person, and one ALS rescue with two paramedics. The reason for the additional ALS engines is to plan for the projected demand on the system. The department will need

to evaluate the current trends and increased workloads each year to identify needed enhancements. The additional three personnel ALS rescues are to prepare for the projected increase in ALS transports on the identified units.

The cost of the 12 ALS engines would be $720,000; this is an increase of $180,000 over option two. The cost of the one ALS rescue with a third person is $6900; this is an increase of $6900 over option two. The increase of one paramedic on the ALS rescue would have no additional cost.

The minimum daily staffing level of paramedics would increase from 45 to 66 for each shift. The additional paramedics required would come from the existing 73 paramedics on duty each day and would not require overtime or hiring of paramedics. The department's overall minimum daily staffing levels would increase by one person over option two for a total of five personnel, the increase would not require any additional personnel as they already exist in the system.

The overall enhancements of the EMS delivery system with this option are as follows; implementation of 12 ALS engines at a cost of $720,000, implementation of five ALS three person rescues at a cost of $34,500, and implementation of one two paramedic unit with no additional cost. The total startup cost for this proposal is approximately $754,500 ($444,000 equipment cost and $310,500 ongoing incentive costs). (Appendix F)

The enhancements listed above in option three will give the greatest outcome to the citizens of Palm Beach County and is a cost-effective approach to enhancing the EMS delivery system within PBCFR.

Option Four: The enhancements explored here would be increasing the department's EMS delivery system to the highest level found in the research

conducted for this ARP. It totals out to be the greatest cost but has the greatest outcome. In order for the department to make this type of enhancement to the EMS delivery system, it would require additional funding not provided in our proposed budget. This option can provide the department with a vision of having a system to address all aspects of the increasing demands.

Option four (Appendix F) includes all aspects of option three with the addition of increasing all remaining ALS rescues to three person units (two paramedics and one EMT). The increase in staffing would require the hiring of 23 paramedics per shift for a total of 69 paramedics. The estimated cost of hiring 69 paramedics is $3,481,238. Past practice has shown that the hiring of 69 paramedics would require about two years to complete. Another issue to consider with this option is the amount of time required for a newly hired paramedic to function as a department approved paramedic. There could be the possibility that the department would have 69 paramedics on probation at the same time.

This option is one that would require a greater time period to implement over any of the other options. It would require approximately three years to complete, which could be a key element of this option. The three-year window allows the department to identify alternative funding.

The overall enhancements of the EMS delivery system with this option are as follows; implementation of 12 ALS engines at a cost of $720,000, and implementation of all ALS rescues with a third person (two paramedics and one EMT) at a cost of $3,514,500. The total startup cost for this proposal is approximate $4,235,738 ($444,000 equipment cost and all other costs are ongoing personnel costs). (Appendix F)

Research Question #3.

3. Does PBCFR have sufficient resources to implement the identified options?

The department appears to be able to increase the EMS delivery system in two of the options listed above with their current daily staffing. In options two and three, the department would only have to re-deploy personnel to fulfill the enhancements. In option one, the department would be required to hire 21 paramedics in order to provide two paramedics on all ALS units. In option four, the department would be required to hire 69 paramedics. The hiring of 69 paramedics would be a long process due to the statewide shortage of paramedics and the increase of time spent to become a paramedic.

As far as ALS engines, the department would need to purchase the ALS equipment to be able to place these units in service. Due to the ALS equipment falling within the guidelines of capital items, the department would be required to go before the Board of County Commissioners for approval. All of the apparatus can be re-configured to accommodate the added equipment, which is presently being done with the existing ALS engines.

One area that was discovered while preparing for this answer of the ARP was the increase of three person ALS rescues requires additional SCBA's on those units. One method is to remove the extra SCBA from the engines to be used on the ALS rescues. This method has its limitations due to the department no longer having a backup SCBA's on scene in case of a failure. This will require additional cost analysis to determine the financial impact.

Research Question #4.

4. Is there alternative funding available to off set the cost of the identified option?

The largest area of alternative funding comes in the way of revenue generated from the billing for ALS transports. The department consistently has had one of the highest collection rates in the state of Florida. The collection rate for ALS transports has been approximately 80%, the collection rate is much greater than predicted and has remained high for the past three years. The revenue from ALS transports is used to off set cost of providing the ALS services to the citizens of Palm Beach County. In 1995, when the department proposed to transport all ALS patients it was presented that the funds generated would be used to off set the cost of doing business and enhance the EMS delivery system. If the department was to utilize a portion of the increase in revenues each year to enhance the system they could choose any of the options listed above. One area of caution is the reform of the allowable fee schedule by Medicare. PBCFR has always based their collection rate and billing from the allowable fee schedule.

Palm Beach County has an independent Health Care Taxing District responsible for the trauma system and indigent health care. They have been sponsoring programs within Palm Beach County to enhance the health care delivery system within the county. One of the most resent programs they sponsored was Basic Trauma Life Support (BTLS) certification training for all paramedics and EMT's in Palm Beach County. Each year the Health Care Taxing District reports a surplus of revenue and attempts to increase the health care services provided by the county. PBCFR should request a grant from the Health Care Taxing District to enhance the EMS delivery system provided to the citizens of Palm Beach County.

There are several state and local grants available to PBCFR for the enhancements of the EMS delivery system. The state of Florida offers an EMS grant each year to agencies seeking revenue to enhance their EMS delivery system. The department has purchased radios and AED's with this grant in the past. There is also a County EMS grant that can be obtained for EMS delivery enhancements. PBCFR should seek grants to purchase the required ALS equipment to place 12 ALS engines in service.

Another alternative funding source is private foundations located in Palm Beach County, which offer grants to increase public health and safety. These grants vary as to amounts and purpose, but are usually more difficult for an agency our size to obtain.

The department could also request to exceed the mill rate cap of three-mills, to cover the additional cost of enhancing the EMS delivery system. In this case, approval of the Board of County Commissioners would be required and the likelihood of it passing would depend greatly, on which option was presented.

Another area looked at in regards to alternative funding is the financing of the ALS equipment. Two separate amortization charts (NFA, 1997) were completed to show the overall cost of financing the ALS equipment in options two and three over a ten-year period (Appendix G). The cost of ALS equipment in option four remains the same as option three. The cost of increased SCBA's was not included in any of the proposals.

DISCUSSION

Departments across the nation are faced with the increasing demand to provide greater depth of EMS service. As Gordon Sachs wrote, "In all, 21st century EMS will be an expanding field"(Sachs, 2000). This is one observation that is believed by all parties in the EMS field.

The Bureau of Labor Statistics has projected that the occupation of EMT-paramedic will increase by 31% over the next six years. (BLS, 1999) This will be the minimum growth in most parts of the country due to a much greater increase in population than the average. Palm Beach County is one of those areas that will have a much faster growth potential than the average county. It is evident that PBCFR will exceed the projected growth over the next five years.

There was a lot of valuable information found in JEMS magazine while conducting the research for this ARP. The two articles written on the *200 City Survey* gave me the information to compare PBCFR to the rest of the country in the area of EMS delivery systems. One of the first comparisons was to see what our department's ratio of units to population would be. As JEMS reported the average was "one vehicle per 18,111 people". (Lindstrom & Mayfield, 2000) Our department's ratio is one vehicle to 13,513 people. It shows that our vehicle to population ratio is not far off the national average, and is slightly better.

The transport averages were also contained within the article, and according to JEMS, the average transport ratio was 67.1%. "On a per capita basis, this translates to 1,246 responses and 781 transports last year for 10,000 people". (Lindstrom & Mayfield, 2000) Our department's ratio in the area of transports was 39% or 1490

medical responses and 555 ALS transports per unit for FY 2000. This is below the national average as a whole but we have units that are above the average.

The survey also requested billing and collection ratios from departments being surveyed and fewer than 50% responded. "The average collection ratio among reporting agencies is 57.6%, with 60% most frequently reported". (Lindstrom & Mayfield, 2000) PBCFR has a collection rate of 80%, which is one of the highest in the state and is 20% above the national average. The department's goal on collection rates has been 65%, which they have exceeded each year.

In the area of EMS system delivery enhancements JEMS reported that 71% of the fire service agencies responding to the survey report they are increasing their ALS capabilities. The key element to this article lies within the summary when the author stated, "the capture and analysis of operational and clinical data by EMS systems will prove essential to understanding what changes can be made to enable them to meet future demands". (Cady & Lindberg, 2001) This was one of the fundamentals used to address the problem that PBCFR faced. The cost-effective analysis will allow the department to enhance their EMS delivery system to provide the greatest outcome.

This was the case in LAFD when they were faced with increasing the EMS delivery system by adding additional ALS units with existing personnel. They met a great deal of opposition by the labor groups, which will be the case in Palm Beach County. Local 2928 have been attempting to answer the members cry for more help on the ALS units, and any changes other than that of increasing the ALS units to two paramedics and one EMT will be unacceptable.

The measurement tools available to identify what is a better delivery system, two paramedics or a paramedic and an EMT does not exist at this point. Dr. Lilja adds that, "for one thing, there is no literature out there -none- that says two paramedics provide better care or have better cardiac arrest outcomes than a paramedic and an EMT". And he states, "I think it's a labor issue more than a medical quality issue". (Nordberg, 2000) I believe that is the issue here in Palm Beach County.

As the article comes to a close Dr. Eckstein states, "People might say, if you had unlimited funds and in an ideal world, would you have a medic on every engine and two on every ambulance? Of Course". (Nordberg, 2000) In the answer to research question two, option four fits this description and would be the proposal that would have the least resistance from the labor groups. The increase in cost is the greatest obstacle to option four in the answer to research question two.

As stated in the *Occupational Outlook Handbook,* "driving the growth will be an expanding population, particularly in older age groups that are the greatest users of emergency medical services". (BLS, 1999) Palm Beach County is one of the fastest growing counties in the southeastern United States; most of the growth is from the elderly population looking for a great place to spend their retirement years.

The utilization of ALS engines in a first responder approach combined with a system similar to the "one-plus-one" (Nordberg, 2000) may give the greatest outcome to the citizens of Palm Beach County.

I feel that the information obtained in the research will support the development of solid recommendations and an opportunity for the department to prepare for the future.

RECOMMENDATIONS

There are several recommendations that are to be made from this research. They involve areas such as; current staffing, EMS delivery system enhancements, and future needs. Additional research will be required in regards to the impact the department will experience with the changes in the ambulance fee schedule and the staffing level standard presented in NFPA 1710.

The department must act now to fill all available paramedic assignments. Any future hiring of personnel to fill replacement positions should be one for one, but paramedics only. Any personnel hired to fill newly created positions (i.e., increased staffing, new units within existing stations, or new station) should also be paramedics only or required to become a paramedic within 36 months of being hired. The department should continue to increase the number of paramedics employed. The requirement that after 2003, employees need to be a paramedic to sit for promotional exams is a step in the right direction. This also will increase our paramedic count from those seeking advancement.

It is the recommendation of this ARP that the department, utilizing the increased revenues from ALS transports (approximately $560,000) begin to complete option two in FY2001, with the goal of completing option three by the end of FY2002. (Appendix F) The department should start the process of obtaining the ALS equipment necessary to place 12 ALS engines in service and the re-allocation of five personnel daily to increase the EMS delivery system with PBCFR. As the department is making the enhancements listed in option three (Appendix F) they should obtain alternative funding to move towards completing option four (Appendix F). Option

four should be the overall goal for the department to strive for over the next few years. The department will be successful in completing option four as long as they take every effort to move forward in a cost-effective manner. Each step of the process needs to be evaluated for the cost-effectiveness and adjustments made when necessary.

. The lessons learned at the National Fire Academy's *Fire Service Financial Management* class must be utilized. This is to assure the success of an on going cost-effective analysis of the EMS delivery system within PBCFR.

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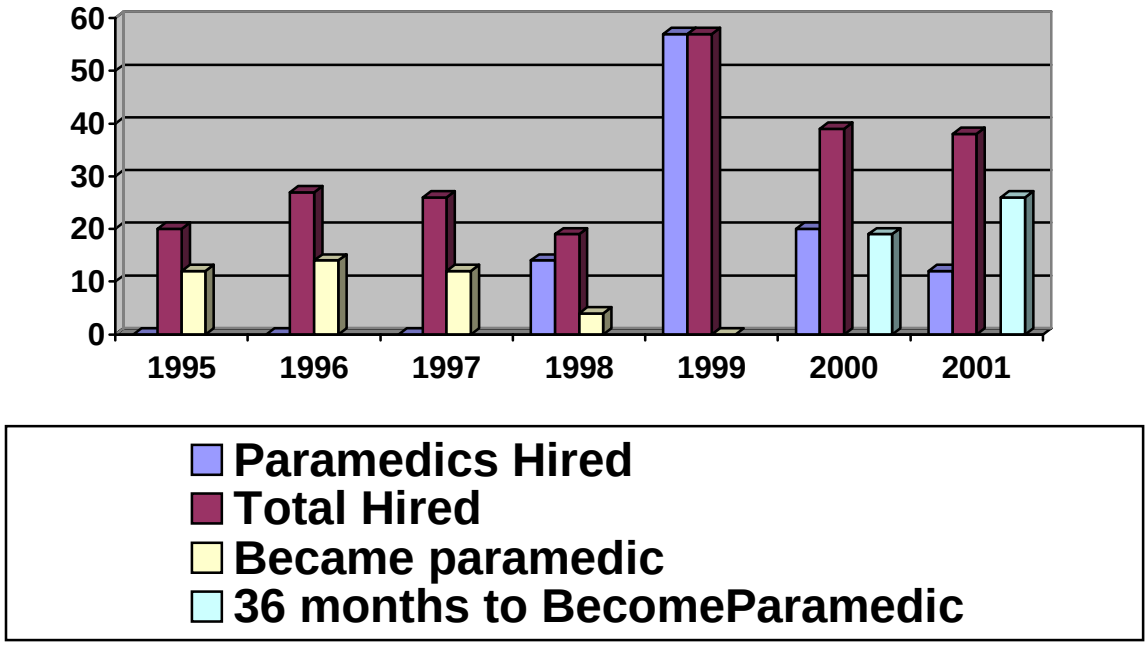
APPENDIX A

Current Staffing Configuration FY2000

Station	Units	Personnel	Number of PM
11	E11, R11	5	1
14	E14,R14,T14	6	1
15	Q15, R15	5	1
16	E16,R16,so16	7	1
17*	RE17,R17	3	1
18**	RP18	3	1
19	E19, R19	5	1
21	E21,R21,T21	6	1
23	E23,R23,R23B	7	2
24	E24, R24	5	1
25	E25, R25	5	1
26	E26, R26	5	1
27*	RE27, R27	3	1
28	E28. R28	5	1
29*	RE29, R29	3	1
31***	E31,R31.S031	8	2
32	E32, R32	5	1
33***	E33, R33	6	2
34	E34, R34	5	1
35*	RE35, R35	3	1
36**	RP36	3	1
37	RE37, R37	5	2
41***	RE41, R41	6	3
42	E42, R42	5	1
43	E43, R43, T43	6	1
45***	R45, R45B	5	3
46	RE46, R46	5	2
47**	RP47	3	1
51	E51,R51	5	1
52*	RE52, R52	3	1
53	R53	3	2
54	Q54, R54	5	1
55	E55,R55,R55B	7	2
57	E57	3	0
81*	RE81, R81	3	1
	TOTALS	167	45

APPENDIX B

PBCFR Employment Statistics for 1995-2001



Note: The above information is taken from PBCFR's annual reports for FY1995-FY2000

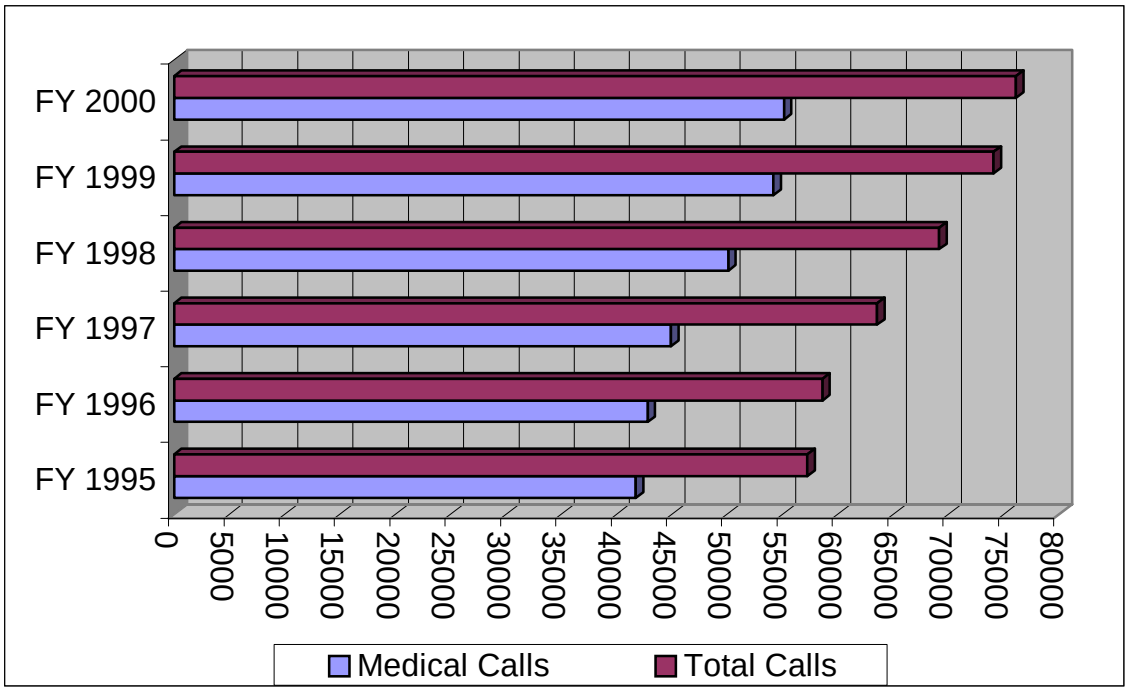
PBCFR Projected Replacement Needs Assessment

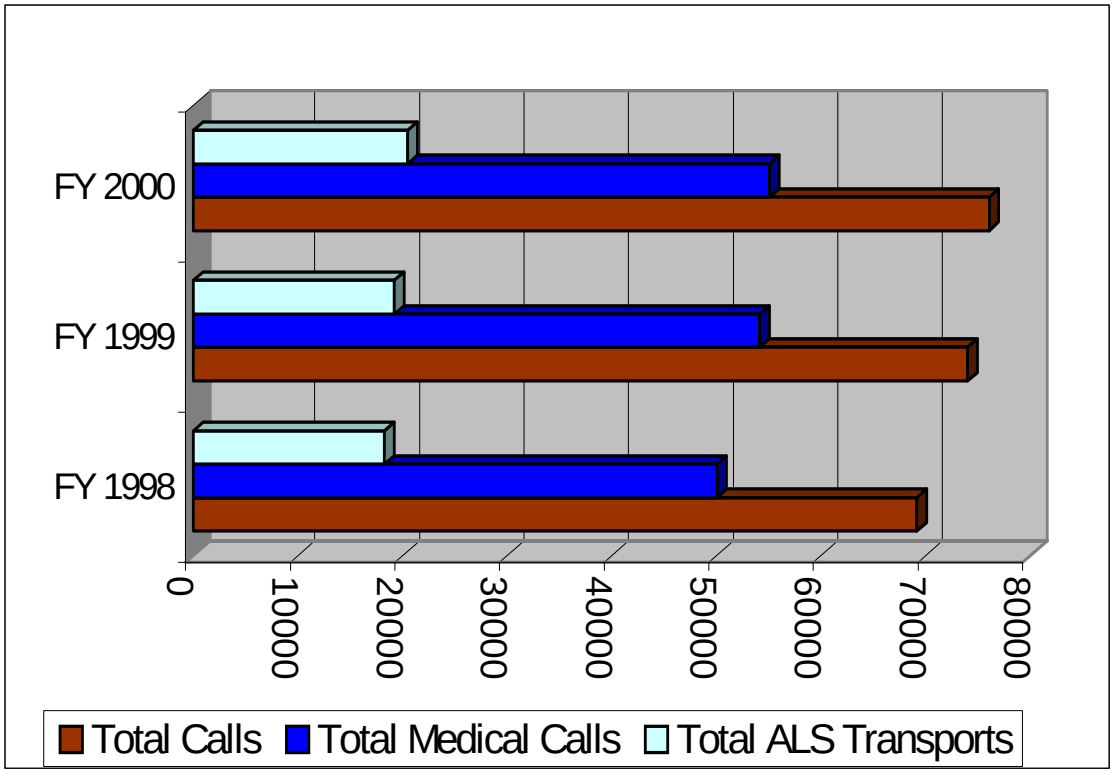
Year	2000	2001	2002	2003	2004
Retirements*	18	12	16	34	30
**Promotions ** **	14	10	10	12	13
Paramedics	8	4	5	11	10
Total Position	18	12	16	34	30
Total PM Needs***	**22**	**14**	**15**	**23**	**23**
Difference +/-	**+4**	**+2**	**-1**	**-11**	**-7**

*The information is based on year of eligibility for retirement, and does not include the drop program.
** The promotions made from officers retiring.
*** This is to maintain the current staffing levels and paramedic assignments. Additional stations would require an increase of paramedics not listed above.

APPENDIX C

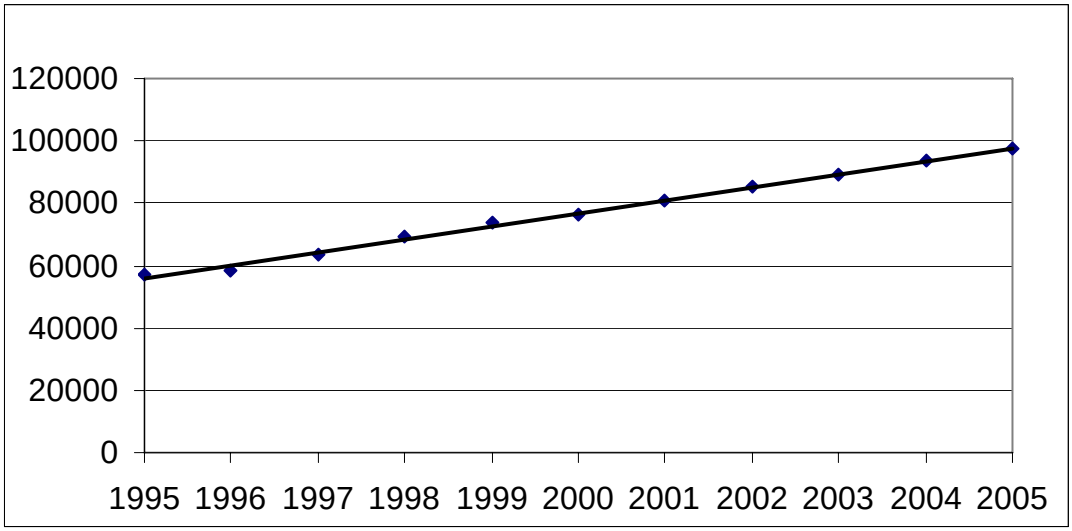
TOTAL CALL VOLUME FY1995-2000





APPENDIX D

Forecast Total Call Volume FY1995-2005

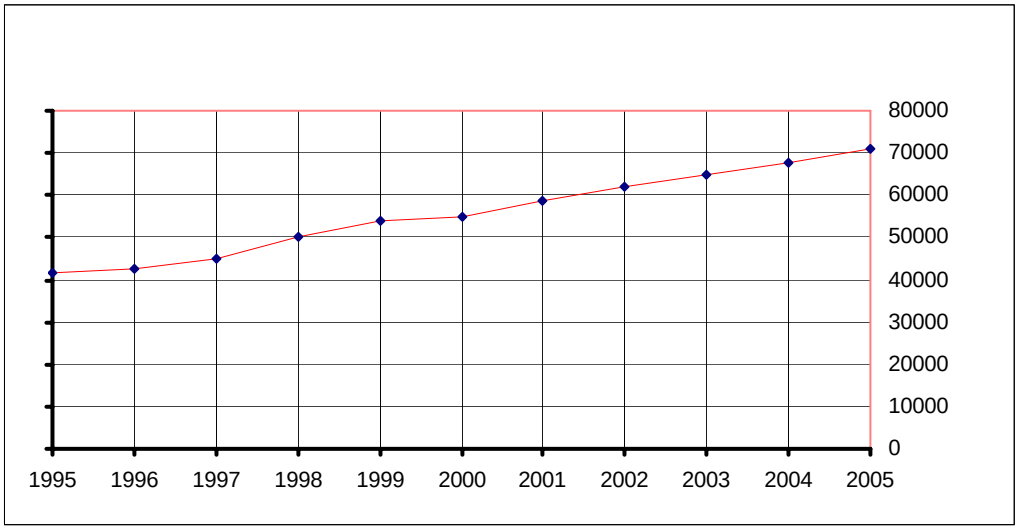


Forecast Total Call Volume

Independent Variable	Dependant Variable	
1995	57244	
1996	58595	
1997	63556	
1998	69172	
1999	74066	
2000	76101	
2001	81087	< Prediction
2002	85267	< Prediction
2003	89448	< Prediction
2004	93628	< Prediction
2005	97809	< Prediction

APPENDIX D

Forecast Total Medical Volume FY1995-2005

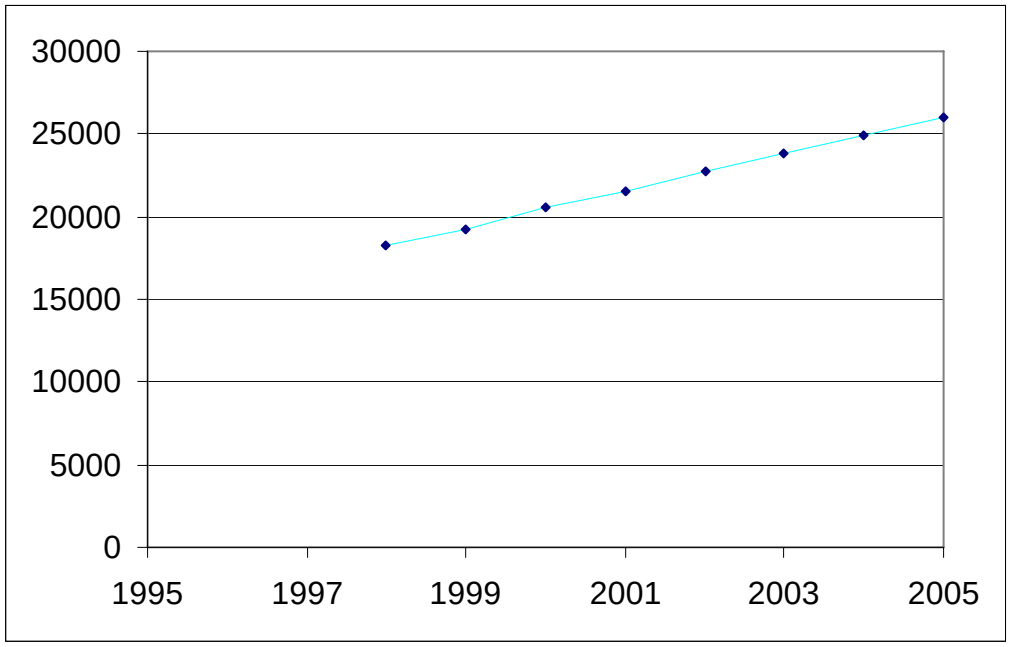


Forecast Medical Call Volume

Independent Variable	Dependant Variable	
1995	41736	
1996	42812	
1997	44911	
1998	50086	
1999	54163	
2000	55127	
2001	58757	< Prediction
2002	61791	< Prediction
2003	64825	< Prediction
2004	67859	< Prediction
2005	70893	< Prediction

APPENDIX D

Forecast Total ALS Transport Volume FY1995-2005

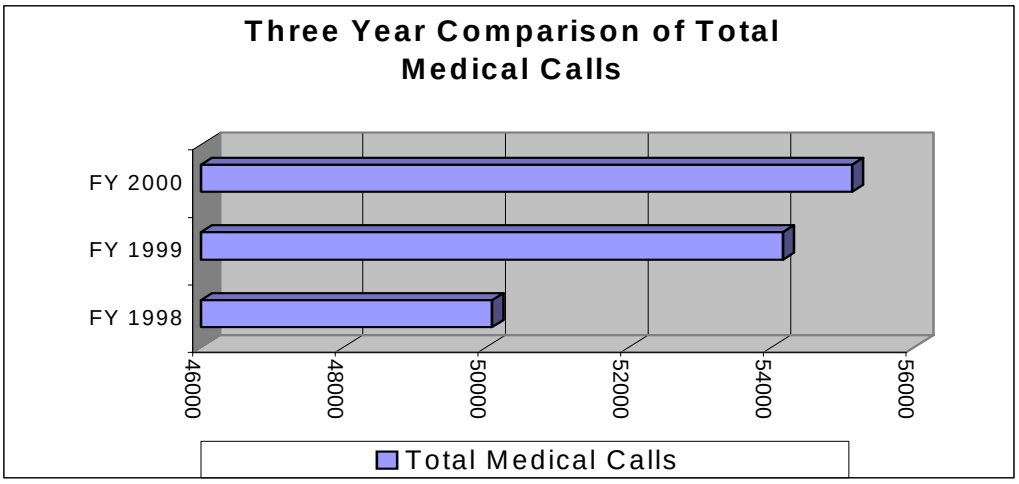


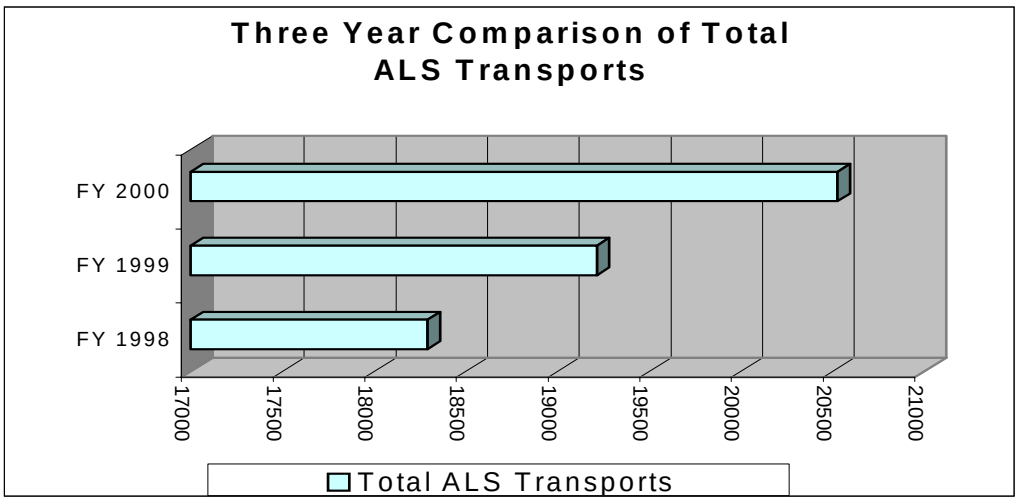
Forecast ALS Transport Volume

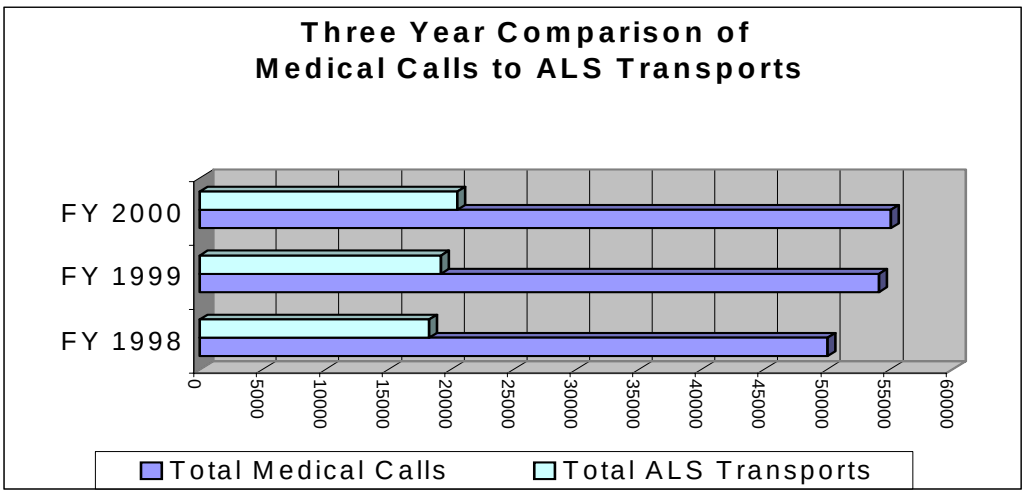
Independent Variable	Dependant Variable	
1995		
1996		
1997		
1998	18292	
1999	19215	
2000	20528	
2001	21581	< Prediction
2002	22699	< Prediction
2003	23817	< Prediction
2004	24935	< Prediction
2005	26053	< Prediction

APPENDIX E

MEDICAL CALL VOLUME FY1998-2000







APPENDIX F

OPTION ONE

Station	Units	Personnel	Number of PM
11	E11, R11	5	2
14	E14,R14,T14	6	2
15	Q15, R15	5	2
16	E16,R16,so16	7	2
17*	RE17,R17	3	2
18**	RP18	3	2
19	E19, R19	5	2
21	E21,R21,T21	6	2
23	E23,R23,R23B	7	4
24	E24, R24	5	2
25	E25, R25	5	2
26	E26, R26	5	2
27*	RE27, R27	3	2
28	E28. R28	5	2
29*	RE29, R29	3	2
31***	E31,R31.S031	8	2
32	E32, R32	5	2
33***	E33, R33	6	2
34	E34, R34	5	2
35*	RE35, R35	3	2
36**	RP36	3	2
37	RE37, R37	5	4
41***	RE41, R41	6	4
42	E42, R42	5	2
43	E43, R43, T43	6	2
45***	R45, R45B	5	4
46	RE46, R46	5	4
47**	RP47	3	2
51	E51,R51	5	2
52*	RE52, R52	3	2
53	R53	3	2
54	Q54, R54	5	2
55	E55,R55,R55B	7	4
57	E57	3	0
81*	RE81, R81	3	2
	PROPOSED TOTALS	**167**	**80**
	CURRENT TOTALS	**167**	**45**
	DIFFERENCE	**0**	**35**

APPENDIX F

OPTION TWO

Priority	Station	Unit	Cost	Total Calls	Medical Calls	Transports	Unavailable	Comments
Low	11	R11	None	332	223	97	2.10%	Relocate to station 18
Low	11	E11	None	332	223	97	2.10%	Exchange with RP18
Low	18	RP18	None	1015	756	334	15.80%	Exchange with E11
Low	19	E19	#1	2595	1987	985	5.90%	The increase would add an additional ALS unit to Jupiter Service area
High	23	E23	#1	5839	4611	1445	9.50%	Engine 23 to become ALS to assist with call volume in 23 area
High	23	R23A	#2	5839	4611	1445	9.50%	Increase R23 A 3 person unit two PM's and one EMT
High	24	E24	#1	2291	1785	454	9.50%	Engine 24 to become ALS to assist with call volume in 23/24 area
High	31	E31	#1	4401	3627	1204	13.30%	Engine 31 to become ALS to assist with call volume in 31/36 area
High	32	E32	#1	3649	2769	1211	7.90%	Engine 32 to become ALS to assist with call volume in 32 area
High	32	R32	#2	3649	2769	1211	7.90%	Increase R32 to a 3 person unit two PM's and one EMT
High	33	E33	#1	5882	4808	1629	4.90%	Engine 33 to become ALS to assist with call volume in 33/36 area
Moder	43	E43	#1	1746	1336	474	7.40%	This engine backs up 31, 32, 35, and 36's areas
Low	45	R45B	#3	5135	3885	1492	13.6	Increase the Bravo unit to 2 PM's
High	51	E51	#1	3625	2478	1021	11.00%	Engine 51 to become ALS to assist with call volume in 51/55 area
Moder	51	R51	#2	3625	2478	1021	11.00%	Increase R51 3 person unit two PM's and one EMT
High	55	E55	#1	5466	3857	1722	3.30%	Engine 55 to become ALS to assist with call volume in 55/51 area
High	55	R55A	#2	5466	3857	1722	3.30%	Increase R55 A 3 person unit two PM's and one EMT

#1- the cost of improvement #1 is $37,000 for equipment and 10% incentive pay for the officer or driver if they are paramedics-
total Approximate Cost is $ 60,000 per unit

#2-the cost of improvement #2 is EMT incentive pay of 5%. Approximate Cost is $6900 per unit.

#3- The cost of improvement #3 is none due to the paramedic already receiving incentive pay.

Increase of 9 ALS Engines $540,000 Equipment Amortized over ten years at $43,125 Annual Appendix G

Increase of 4 ALS rescues with third person $27,600

TOTAL APPROXIMATE COST OF PROPOSAL **$567,600** Annual on-going cost of $234,600

7 ALS engines and 3 3person rescues are high priority with approximate cost of $440,700

1 ALS engine and 1 3person rescue on the moderate priority list for an approximate cost of $66,900

1 ALS engine on the low priority list for an approximate cost of $60,000

APPENDIX F

OPTION THREE

Priority	Station	Unit	Cost	Total Calls	Medical Calls	Transports	Unavailable	Comments
Low	11	R11	None	332	223	97	2.10%	Relocate to station 18
Low	11	E11	None	332	223	97	2.10%	Exchange with RP18
Low	16	E16	#1	1211	766	213	5.10%	Engine 16 to become ALS to assist with call volume in 16 area
Low	18	RP18	#1	1015	756	334	15.80%	Engine 18 to become ALS unit to increase Jupiter Service area
Low	19	E19	#1	2595	1987	985	5.90%	The increase would add an additional ALS unit to Jupiter Service area
High	23	E23	#1	5839	4611	1445	9.50%	Engine 23 to become ALS to assist with call volume in 23 area
High	23	R23A	#2	5839	4611	1445	9.50%	Increase R23 A 3 person unit two PM's and one EMT
High	24	E24	#1	2291	1785	454	9.50%	Engine 24 to become ALS to assist with call volume in 23/24 area
Low	28	E28	#1	1724	1224	544	5.60%	Engine 28 to become ALS to assist with call volume in 21/28 area
High	31	E31	#1	4401	3627	1204	13.30%	Engine 31 to become ALS to assist with call volume in 31/36 area
High	32	E32	#1	3649	2769	1211	7.90%	Engine 32 to become ALS to assist with call volume in 32 area
High	32	R32	#2	3649	2769	1211	7.90%	Increase R32 to a 3 person unit two PM's and one EMT
High	33	E33	#1	5882	4808	1629	4.90%	Engine 33 to become ALS to assist with call volume in 33/36 area
Moder	43	E43	#1	1746	1336	474	7.40%	This engine backs up 31, 32, 35, and 36's areas
Low	43	R43	#2	1746	1336	474	7.40%	Increase R43 to a 3 person unit two PM's and one EMT
Low	45	R45B	#3	5135	3885	1492	13.6	Increase the Bravo unit to 2 PM's
High	51	E51	#1	3625	2478	1021	11.00%	Engine 51 to become ALS to assist with call volume in 51/55 area
Moder	51	R51	#2	3625	2478	1021	11.00%	Increase R51 3 person unit two PM's and one EMT
High	55	E55	#1	5466	3857	1722	3.30%	Engine 55 to become ALS to assist with call volume in 55/51 area
High	55	R55A	#2	5466	3857	1722	3.30%	Increase R55 A 3 person unit two PM's and one EMT

#1- the cost of improvement #1 is $37,000 for equipment and 10% incentive pay for the officer or driver if they are paramedics-
total Approximate Cost is $ 60,000 per unit

#2-the cost of improvement #2 is EMT incentive pay of 5%. Approximate Cost is $6900 per unit.

#3- The cost of improvement #3 is none due to the paramedic already receiving incentive pay.

Increase of 12 ALS Engines $720,000 Equipment Amortized over ten years at $57,500 Annual Appendix G

Increase of 5 ALS rescues with third person $34,500 Annual on-going cost of $310,500

TOTAL APPROXIMATE COST OF PROPOSAL **$754,500**

7 ALS engines and 3 3person rescues are high priority with approximate cost of $440,700

1 ALS engine and 1 3person rescue on the moderate priority list for an approximate cost of $66,900

4 ALS engine and 1 3 person rescue on the low priority list at an approximate cost of $246,900

APPENDIX F

OPTION FOUR

Priority	Station	Unit	Cost	Total Calls	Medical Calls	Transports	Unavailable	Comments
Low	11	R11	None	332	223	97	2.10%	Relocate to station 18
Low	11	E11	None	332	223	97	2.10%	Exchange with RP18
Low	16	E16	#1	1211	766	213	5.10%	Engine 16 to become ALS to assist with call volume in 16 area
Low	18	RP18	#1	1015	756	334	15.80%	Engine 18 to become ALS unit to increase Jupiter Service area
Low	19	E19	#1	2595	1987	985	5.90%	The increase would add an additional ALS unit to Jupiter Service area
High	23	E23	#1	5839	4611	1445	9.50%	Engine 23 to become ALS to assist with call volume in 23 area
High	23	R23A	#2	5839	4611	1445	9.50%	Increase R23 A 3 person unit two PM's and one EMT
High	24	E24	#1	2291	1785	454	9.50%	Engine 24 to become ALS to assist with call volume in 23/24 area
Low	28	E28	#1	1724	1224	544	5.60%	Engine 28 to become ALS to assist with call volume in 21/28 area
High	31	E31	#1	4401	3627	1204	13.30%	Engine 31 to become ALS to assist with call volume in 31/36 area
High	32	E32	#1	3649	2769	1211	7.90%	Engine 32 to become ALS to assist with call volume in 32 area
High	32	R32	#2	3649	2769	1211	7.90%	Increase R32 to a 3 person unit two PM's and one EMT
High	33	E33	#1	5882	4808	1629	4.90%	Engine 33 to become ALS to assist with call volume in 33/36 area
Moder	43	E43	#1	1746	1336	474	7.40%	This engine backs up 31, 32, 35, and 36's areas
Low	43	R43	#2	1746	1336	474	7.40%	Increase R43 to a 3 person unit two PM's and one EMT
Low	45	R45B	#3	5135	3885	1492	13.6	Increase the Bravo unit to 2 PM's
High	51	E51	#1	3625	2478	1021	11.00%	Engine 51 to become ALS to assist with call volume in 51/55 area
Moder	51	R51	#2	3625	2478	1021	11.00%	Increase R51 3 person unit two PM's and one EMT
High	55	E55	#1	5466	3857	1722	3.30%	Engine 55 to become ALS to assist with call volume in 55/51 area
High	55	R55A	#2	5466	3857	1722	3.30%	Increase R55 A 3 person unit two PM's and one EMT
Low	All	Rescue	#4					Add 3rd person to all 2 person ALS rescues (2 PM and 1 EMT)

#1- the cost of improvement #1 is $37,000 for equipment and 10% incentive pay for the officer or driver if they are paramedics-
total Approximate Cost is $ 60,000 per unit

#2-the cost of improvement #2 is EMT incentive pay of 5%. Approximate Cost is $6900 per unit.

#3- The cost of improvement #3 is none due to the paramedic already receiving incentive pay.

#4 Increase all ALS units to 3 personnel 2 PM and 1 EMT , resulting in an additional 23 paramedics per shift and an increase in daily staffing levels by the same 23 paramedics per shift (69 personnel) for an approximate cost of $2.58 million, which will be an ongoing cost.

Increase of 12 ALS Engines $720,000 Equipment Amortized over ten years at $57,500 Annual Appendix G

Increase of 5 ALS rescues with third person $34,500

TOTAL APPROXIMATE COST OF PROPOSAL **$3,254,500**

7 ALS engines and 3 3person rescues are high priority with approximate cost of $440,700

1 ALS engine and 1 3person rescue on the moderate priority list for an approximate cost of $66,900

4 ALS engine and all ALS units 2 PM and 1 EMT on the low priority list for an approximate cost of $2,740,000

APPENDIX G

Amortization Table

The amortization table at the end of this worksheet calculates the principal and interest payments, ending balance,

ALS EQUIPMENT TOTAL OF NINE SETS

LOAN DATA

Loan amount:	**$333,000.00**
Annual interest rate:	**5.00%**
Term in years:	**10**
Payments per year:	**1**
First payment due:	**10/1/01**

TABLE DATA

Table starts at date:	
or at payment number:	**0**

PERIODIC PAYMENT

Entered payment:	
Calculated payment:	**$43,125.02**

The table uses the calculated periodic payment amount, unless you enter a value for "Entered payment."

CALCULATIONS

Use payment of:	**$43,125.02**
1st payment in table:	**1**

Beginning balance at payment 1:	**$333,000.00**
Cumulative interest prior to payment 1:	**$0.00**

Table

No.	Payment Date	Beginning Balance	Interest	Principal	Ending Balance	Cumulative Interest
1	10/1/01	333,000.00	16,650.00	26,475.02	306,524.98	16,650.00
2	10/1/02	306,524.98	15,326.25	27,798.77	278,726.20	31,976.25
3	10/1/03	278,726.20	13,936.31	29,188.71	249,537.49	45,912.56
4	10/1/04	249,537.49	12,476.87	30,648.15	218,889.34	58,389.43
5	10/1/05	218,889.34	10,944.47	32,180.56	186,708.78	69,333.90
6	10/1/06	186,708.78	9,335.44	33,789.58	152,919.20	78,669.34
7	10/1/07	152,919.20	7,645.96	35,479.06	117,440.14	86,315.30
8	10/1/08	117,440.14	5,872.01	37,253.02	80,187.12	92,187.31
9	10/1/09	80,187.12	4,009.36	39,115.67	41,071.45	96,196.66
10	10/1/10	41,071.45	2,053.57	41,071.45	0.00	98,250.23

APPENDIX G

Amortization Table

The amortization table at the end of this worksheet calculates the principal and interest payments, ending balance,

ALS EQUIPMENT TOTAL OF TWELVE SETS

LOAN DATA

Loan amount:	**$444,000.00**
Annual interest rate:	**5.00%**
Term in years:	**10**
Payments per year:	**1**
First payment due:	**10/1/01**

TABLE DATA

Table starts at date:	
or at payment number:	**0**

PERIODIC PAYMENT

Entered payment:	
Calculated payment:	**$57,500.03**

The table uses the calculated periodic payment amount, unless you enter a value for "Entered payment."

CALCULATIONS

Use payment of:	**$57,500.03**	Beginning balance at payment 1:	**$444,000.00**
1st payment in table:	**1**	Cumulative interest prior to payment 1:	**$0.00**

Table

No.	Payment Date	Beginning Balance	Interest	Principal	Ending Balance	Cumulative Interest
1	10/1/01	444,000.00	22,200.00	35,300.03	408,699.97	22,200.00
2	10/1/02	408,699.97	20,435.00	37,065.03	371,634.94	42,635.00
3	10/1/03	371,634.94	18,581.75	38,918.28	332,716.65	61,216.75
4	10/1/04	332,716.65	16,635.83	40,864.20	291,852.45	77,852.58
5	10/1/05	291,852.45	14,592.62	42,907.41	248,945.04	92,445.20
6	10/1/06	248,945.04	12,447.25	45,052.78	203,892.26	104,892.45
7	10/1/07	203,892.26	10,194.61	47,305.42	156,586.85	115,087.07
8	10/1/08	156,586.85	7,829.34	49,670.69	106,916.16	122,916.41
9	10/1/09	106,916.16	5,345.81	52,154.22	54,761.93	128,262.22
10	10/1/10	54,761.93	2,738.10	54,761.93	0.00	131,000.31